

Physics of Nonequilibrium Atomic Systems and Composites

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Bachelor degree**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **316 290 rubles per semester**

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The objectives are to prepare graduates to research and industrial activities in the fields of physics of nonequilibrium atomic systems and composites; at the stage of graduate training, to provide basic humanitarian, mathematics, natural sciences and professional knowledge, specialized competencies; and give graduates skills in the professional field and prepare them for the Masters.

Sphere and objects of professional activity:

Exploitation of modern physical equipment and devices, development of technological processes of new materials during preparation of production of new materials, devices, and systems. Performance of experimental and theoretical research to solve scientific and industrial tasks on the separation of isotopic and multiphase mixtures using modern computer technology and methods of experimental physics. The choice of methods and carrying out calculations of liquid-gas-dynamic flows. Design and operation of automatic control systems with the use of high technologies of computing. Installation, testing and commissioning of device prototypes, systems and components of experimental devices. Selection of parts, fixing and verification of analytical and mass-spectrometric devices. Selection of schemes and mounting of installations for obtaining pure and ultra-pure substances on the basis of the latest achievements of membrane technology.

Brief description of the curriculum. The curriculum retains the traditional fundamental principles of engineers training and includes physical, mathematical and engineering disciplines. It also includes a lot of special disciplines, for example, physical kinetics, hydrodynamics, gas dynamics, special chapters of physics of separation processes, physical basis of the separation of mixtures, fundamentals of molecular selective devices, fundamentals of membrane technology, physical basis of the separation of mixtures, ion optics, sorption processes in vacuum techniques, etc.

Practice:

Scientific and Industrial Practice (2 weeks at the 3rd course).

Research Practice (during the 3rd and 4th courses).

Module 1 "Humanities"

Module 2 "Natural sciences"

Module 3 "Professional"

Organizations for practice:

- National Research Nuclear University MEPhI;
- National Research Centre "Kurchatov Institute";
- Russian Federal Nuclear Center –All-Russia Research Institute of Technical Physics;
- Russian Federal Nuclear Center – Zababakhin All-Russia Research Institute of Experimental Physics;
- Topchiev Institute of Petrochemical Synthesis of the Russian Academy of Sciences;
- Dukhov All-Russia Research Institute of Automatics;
- National Research Institute of Physicotechnical and Radio Engineering Measurements;
- Leading Research Institute of Chemical Technology;

- State Scientific Center of the Russian Federation "Central Research Institute of Chemistry and Mechanics," etc.

The program of continuous training: Bachelor's Degree - Master of Science - Post Graduate

Specializations within this programme

Nuclear Physics and Technologies

Systems of automatic control high technologies with application of computer technology. Modern physical plant and equipment, including isotope separation, obtaining enriched uranium and reprocessing of spent fuel. Analytical and mass spectrometric equipment. Prototypes of sensors of physical quantities, samples of instruments, systems, components, systems and parts of special apparatuses to obtain pure and ultrapure substances based on the latest achievements of membrane technologies.